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# RESEARCH MEMORANDUM

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EVALUATION OF GUST AND DRAFT VELOCITIES FROM FLIGHTS OF

P-61C AIRPLANES WITHIN THUNDERSTORMS MAY 13, 1947

TO MAY 29, 1947 AT CLINTON COUNTY

ARMY AIR FIELD, OHIO

By

H. B. Tolefson

Langley Memorial Aeronautical Laboratory  
Langley Field, Va.

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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

RESEARCH MEMORANDUM

EVALUATION OF GUST AND DRAFT VELOCITIES FROM FLIGHTS OF

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The gust and draft velocities evaluated from records of NACA instruments installed in P-61C airplanes participating in thunderstorm flights at Clinton County Army Air Field, Ohio, from May 13 to May 29, 1947 are presented herein. In accordance with informal agreement, these data are of the type evaluated for the thunderstorm flights at Orlando, Florida in 1946 (see reference 1) with the major exception that the gust data are presented for consecutive time intervals of each traverse instead of consecutive space intervals. Similarly, the location of draft velocities encountered during the traverses is defined in terms of time rather than distance from the start of the traverse.

Langley Memorial Aeronautical Laboratory  
National Advisory Committee for Aeronautics  
Langley Field, Va.

*Harold B. Tolefson*

Harold B. Tolefson  
Aeronautical Engineer

Approved:

*Richard V. Rhode*

Richard V. Rhode  
Chief of Aircraft Loads Division

fk

## REFERENCE

1. Tolefson, H. B.: Evaluation of Gust and Draft Velocities from Flights of P-61C Airplanes within Thunderstorms. II - July 9, 1946 to July 11, 1946 at Orlando, Florida. NACA RM No. L6I16a, 1946.

TABLE I.- SUMMARY OF GUST MEASUREMENTS FROM FLIGHTS  
OF P-61C AIRPLANES WITHIN THUNDERSTORMS

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
May 13, 1947 - Flight 1								
Airplane 348 - Traverse 1 Length of traverse 134.2 sec, 45,126 ft								
0 - 10	25,500	3.6	-7.1	----	-6.6	---	98	5
10 - 20		3.6	-5.5	7.2	----	138	---	3
<sup>a</sup> 20 - 30		4.2	-5.8	----	-11.4	---	164	3
30 - 40	26,000	3.6	-7.4	----	-19.2	---	340	4
40 - 50		6.8	-3.2	----	----	---	---	7
50 - 60		3.2	-6.8	----	----	---	---	6
60 - 70		9.4	-9.1	----	-9.7	---	221	8
70 - 80	25,500	10.7	-9.4	----	----	---	---	8
<sup>b</sup> 80 - 90	26,000	7.1	-3.2	----	----	---	---	4
90 - 100		2.9	-5.5	6.6	----	103	---	4
100 - 110		----	-3.2	----	----	---	---	2
110 - 120		----	-3.2	----	-6.4	---	251	1
120 - 140		----	----	----	----	---	---	0
Airplane 348 - Traverse 2 Length of traverse 101.5 sec, 35,090 ft								
<sup>a</sup> 0 - 10	26,000	8.1	-4.8	12.1	----	190	---	4
10 - 20		4.5	-4.8	----	----	---	---	4
20 - 30	25,500	6.4	-7.4	----	----	---	---	4
30 - 40		9.0	----	18.2	----	320	---	2
40 - 50		8.4	----	----	----	---	---	3
50 - 60		3.2	-10.0	4.6	----	115	---	2
60 - 70	26,000	6.8	-3.5	----	----	---	---	6
70 - 80		3.2	-3.5	----	----	---	---	2
80 - 90		7.1	-5.5	----	----	---	---	5
<sup>b</sup> 90 - 100		5.2	-4.5	----	----	---	---	5
100 - 110		----	----	----	----	---	---	0

<sup>a</sup>Cloud entry.<sup>b</sup>Cloud exit.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
May 13, 1947 - Flight 1					
Airplane 348 - Traverse 3 Length of traverse 820.3 sec, 284,510 ft					
0 - 260	26,000	----	----	----	0
260 - 270		3.2	----	----	2
270 - 280		----	----	----	0
280 - 290		5.1	-5.4	----	5
290 - 300		3.2	-6.1	----	2
300 - 310		5.4	-8.9	----	6
310 - 320		5.1	-3.2	----	2
320 - 330	25,500	4.5	-2.6	7.7	4
330 - 340		3.5	-2.6	----	3
340 - 350		3.5	-3.2	6.9	4
350 - 360		3.5	-5.1	----	2
360 - 370		----	----	----	0
370 - 380		----	-4.8	----	1
<sup>c</sup> 380 - 390		3.2	-3.2	-10.1	2
390 - 400		3.2	-2.6	----	5
400 - 410		3.2	-8.0	-7.0	6
410 - 420		3.2	----	----	1
420 - 440		----	----	----	0
440 - 450		3.2	-5.1	-11.7	3
450 - 460		----	-4.5	-11.1	2
460 - 470		----	----	----	0
470 - 480		----	-2.6	----	1
480 - 490		----	----	----	0
490 - 500		----	-2.6	----	1
500 - 590	26,000	----	----	----	0
590 - 600		4.8	----	----	1
600 - 620		----	----	----	0
620 - 630		----	-2.9	----	1
630 - 680		----	----	----	0
680 - 690		----	-2.6	-6.5	1
690 - 700		3.2	----	----	1
700 - 710		----	-3.2	----	2
710 - 720		----	-3.5	----	1
720 - 730		5.8	-5.1	-6.2	5
730 - 740		4.5	-1.3	-2.6	2
740 - 750		----	-5.8	----	3

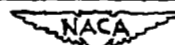
<sup>c</sup>Cloud entry; questionable.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)		Maximum true gust velocity $U_{t\max}$ (fps)		Gust gradient distance (ft)		No. of gusts
May 13, 1947 - Flight 1								
Airplane 348 - Traverse 3 Length of traverse 820.3 sec, 284,510 ft								
750 - 760	26,000	6.1	-2.6	----	-----	---	---	3
760 - 770		6.1	-4.8	13.4	-11.8	249	318	2
770 - 780		3.2	-8.0	----	-----	---	---	4
780 - 790		6.1	-2.2	----	-11.7	---	288	4
790 - 800		3.2	-2.9	----	-----	---	---	3
800 - 810		5.8	-3.5	----	-----	---	---	4
810 - 820		8.0	-5.1	----	-----	---	---	3
Airplane 354 - Traverse 1 Length of traverse 1550.6 sec, 460,187 ft								
$d_0$ - 40	21,000	----	----	----	-----	---	---	0
40 - 50		----	-3.9	----	-6.0	---	63	2
50 - 60		----	----	----	-----	---	---	0
60 - 70		3.2	-3.6	----	-----	---	---	3
70 - 80		----	-3.6	----	-----	---	---	1
80 - 90		3.2	-3.6	----	-6.7	---	167	3
90 - 100		3.2	-3.6	----	-7.1	---	83	5
100 - 110		12.6	-2.9	7.3	-7.9	41	129	9
110 - 120		8.7	----	16.1	-7.9	147	245	5
120 - 130		3.9	-3.6	----	-----	---	---	4
130 - 290	----	----	----	-----	---	---	0	
290 - 300	20,500	2.3	----	----	-----	---	---	1
300 - 310		8.1	-4.9	----	-----	---	---	3
310 - 320		6.2	-9.4	16.6	-----	299	---	4
320 - 330		----	----	----	-----	---	---	0
330 - 340		----	-3.6	----	-----	---	---	1
340 - 350		13.0	-16.5	27.6	-13.2	450	88	5
350 - 360		9.7	-6.8	----	-----	---	---	6
360 - 370		6.8	-6.8	12.9	-----	36	---	8
370 - 380		7.4	-4.2	11.0	-----	31	---	9
380 - 390		3.9	-3.6	----	-6.7	---	254	4
390 - 400		4.5	-3.6	13.1	-----	34	---	4
400 - 410		3.2	-3.6	----	-----	---	---	4
410 - 420		4.5	----	8.3	-----	223	---	1
420 - 450		----	----	----	-----	---	---	0
450 - 460		3.6	-----	----	-----	---	---	2

<sup>d</sup>Cloud entry and exit not indicated on records.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
May 13, 1947 - Flight 1								
Airplane 354 - Traverse 1								
Length of traverse 1550.6 sec, 460,187 ft								
460 - 470	20,500	6.8	-----	5.2	-----	77	---	1
470 - 480		3.9	-----	3.5	-----	145	---	1
480 - 490		-----	-2.9	6.7	-12.1	252	345	2
490 - 500		3.9	-3.6	-----	-----	---	---	4
500 - 510		6.8	-3.6	10.4	-----	282	---	4
510 - 520		-----	-2.9	-----	-6.7	---	163	2
520 - 530		1.9	-3.6	-----	-----	---	---	2
530 - 540		3.2	-----	4.8	-----	161	---	2
540 - 550		5.8	-3.6	10.8	-----	206	---	3
550 - 560		2.6	-2.9	-----	-----	---	---	3
560 - 570		-----	-----	-----	-----	---	---	0
570 - 580		2.9	-----	-----	-----	---	---	1
580 - 590		-----	-----	-----	-----	---	---	0
590 - 600		10.0	-----	12.7	-----	219	---	1
600 - 610		7.4	-3.9	7.2	-----	78	---	2
610 - 620		-----	-----	-----	-----	---	---	0
620 - 630		10.0	-2.9	5.5	-----	57	---	3
630 - 640		5.8	-2.9	3.5	-----	196	---	3
640 - 650		1.9	-----	4.8	-----	207	---	1
650 - 660		3.2	-----	8.4	-----	218	---	1
660 - 670		-----	-3.6	-----	-12.9	---	287	1
670 - 680		-----	-----	-----	-----	---	---	1
680 - 690		2.6	-----	3.0	-----	263	---	1
690 - 820	21,000	-----	-----	-----	-----	---	---	0
820 - 830		-----	-3.5	-----	-----	---	---	1
830 - 840		7.7	-3.9	-----	-----	---	---	7
840 - 850		6.7	-6.1	-----	-----	---	---	8
850 - 860		7.1	-8.0	-----	-----	---	---	5
860 - 870		10.3	-----	20.9	-----	142	---	3
870 - 880		10.6	-8.7	-----	-----	---	---	6
880 - 890		7.1	-7.1	-----	-17.2	---	33	5
890 - 900		7.4	-9.6	-----	-----	---	---	8
900 - 910		-----	-6.1	-----	-----	---	---	2
910 - 920	20,500	15.1	-14.1	-----	-----	---	---	5
920 - 930		7.4	-10.6	-----	-22.4	---	260	6
930 - 970		-----	-----	-----	-----	---	---	0

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e \max}$ (fps)		Maximum true gust velocity $U_{t \max}$ (fps)		Gust gradient distance (ft)		No. of gusts
May 13, 1947 - Flight 1								
Airplane 354 - Traverse 1 Length of traverse 1550.6 sec, 460,187 ft								
970 - 980	20,500	----	-3.5	----	-----	---	---	1
980 - 990		----	----	----	-----	---	---	0
990 - 1000		----	-2.9	----	-----	---	---	1
1000 - 1010		----	----	----	-----	---	---	0
1010 - 1020		----	-2.2	----	-----	---	---	1
1020 - 1030	21,000	3.5	-2.2	7.2	-----	65	---	4
1030 - 1060		----	----	----	-----	---	---	0
1060 - 1070		1.9	----	----	-----	---	---	1
1070 - 1080	20,500	2.6	----	6.4	-----	197	---	1
1080 - 1270		----	----	----	-----	---	---	0
1270 - 1280		7.7	----	----	-----	---	---	1
1280 - 1360		----	----	----	-----	---	---	0
1360 - 1370		2.6	----	----	-----	---	---	1
1370 - 1390		----	----	----	-----	---	---	0
1390 - 1400		2.6	-3.9	----	-----	---	---	3
1400 - 1490		----	----	----	-----	---	---	0
1490 - 1500		6.1	----	11.3	-7.4	207	105	5
1500 - 1510		5.1	----	----	-----	---	---	1
1510 - 1520		7.7	----	----	-----	---	---	2
1520 - 1530		5.5	-4.2	----	-----	---	---	2
1530 - 1540		3.9	----	7.6	-----	86	---	2
1540 - 1560		----	----	----	-----	---	---	0
Airplane 360 - Traverse 1 Length of traverse 394.4 sec, 116,270 ft								
0 - 150	16,000	----	----	----	-----	---	---	0
150 - 160		1.9	-2.9	----	-7.3	---	177	2
160 - 170		----	-1.9	----	-----	---	---	1
170 - 180		1.3	-2.6	----	-----	---	---	3
180 - 210		----	----	----	-----	---	---	0
210 - 220		----	-1.9	----	-5.5	---	148	1
220 - 230		3.6	-2.6	5.6	-----	114	---	4
230 - 240		1.9	-4.8	----	-7.2	---	75	9
240 - 250		3.9	-6.8	----	-----	---	---	7
250 - 260		1.6	-4.5	----	-----	---	---	2



TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
May 13, 1947 - Flight 1								
Airplane 360 - Traverse 1 Length of traverse 394.4 sec, 116,270 ft								
260.- 270	16,000	5.5	-4.2	7.8	-----	127	---	6
<sup>a</sup> 270 - 280		6.5	-6.8	-----	-----	---	---	8
280 - 290		7.1	-8.4	-----	-5.3	---	77	8
290 - 300		3.9	-5.5	-----	-----	---	---	9
300 - 310	15,500	9.1	-10.7	-----	-----	---	---	7
310 - 320	16,000	10.4	-2.3	-----	-----	---	---	4
320 - 330		3.9	-4.5	-----	-----	---	---	6
330 - 340		6.8	-4.2	-----	-----	---	---	9
340 - 350		2.6	-5.5	-----	-----	---	---	5
350 - 360		5.5	-7.8	2.4	-12.3	71	190	4
360 - 370		5.8	-6.8	20.5	-4.2	297	174	5
<sup>b</sup> 370 - 380		3.6	-----	-----	-----	---	---	2
380 - 400		-----	-----	-----	-----	---	---	0
Airplane 360 - Traverse 2 Length of traverse 184.6 sec, 56,036 ft								
0 - 10	16,000	1.3	-1.9	-----	-----	---	---	3
10 - 20		4.2	-9.0	-----	-----	---	---	9
<sup>a</sup> 20 - 30	16,500	16.4	-4.8	29.7	-----	146	---	8
30 - 40		3.5	-4.5	-----	-----	---	---	3
40 - 50		1.9	-8.7	-----	-7.8	---	242	9
50 - 60		10.6	-9.7	-----	-----	---	---	10
60 - 70		2.9	-3.5	-----	-----	---	---	2
70 - 80		3.9	-2.2	-----	-----	---	---	4
80 - 90		8.7	-11.0	-----	-12.7	---	54	9
90 - 100		4.2	-4.8	-----	-----	---	---	13
100 - 110		6.8	-3.5	-----	-----	---	---	5
110 - 120		8.4	-3.9	-----	-----	---	---	9
120 - 130		3.2	-3.5	-----	-----	---	---	3
130 - 140		3.2	-5.5	-----	-5.6	---	160	2
140 - 150		1.9	-----	-----	-4.6	---	134	4
150 - 160		2.6	-5.2	-----	-----	---	---	9
<sup>b</sup> 160 - 170		3.2	-2.2	-----	-----	---	---	4
170 - 180		4.2	-----	-----	-----	---	---	1
180 - 190		-----	-----	-----	-----	---	---	0

<sup>a</sup>Cloud entry.<sup>b</sup>Cloud exit.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of Gusts	
May 13, 1947 - Flight 1									
Airplane 353 - Traverse 1 Length of traverse 403.6 sec, 113,540 ft									
0 - 10	11,000	2.1	-----	-----	-----	---	---	1	
10 - 20		----	-1.6	7.2	-----	187	---	5	
20 - 30		2.9	-3.2	----	-----	---	---	7	
30 - 40		----	-1.6	----	-----	---	---	2	
40 - 70		----	----	----	-----	---	---	0	
70 - 80		2.3	----	----	-----	---	---	1	
80 - 90		2.2	----	----	-----	---	---	1	
90 - 100		3.0	-4.2	----	-8.4	---	358	3	
100 - 110		3.0	-1.6	----	----	---	---	2	
110 - 120		----	-3.2	----	-2.6	---	135	2	
120 - 130		----	----	----	----	---	---	0	
130 - 140		----	-1.6	----	----	---	---	1	
140 - 150		----	-3.2	----	-5.2	---	135	4	
150 - 160		4.4	-4.5	----	----	---	---	6	
160 - 170		----	-3.2	----	----	---	---	3	
<sup>a</sup> 170 - 180	10,500	2.9	-5.8	----	----	---	---	7	
180 - 190		----	-3.8	----	----	---	---	4	
190 - 200		2.9	-4.5	----	----	---	---	8	
200 - 210		6.4	-2.9	----	----	---	---	4	
210 - 220		11,000	4.2	-2.4	----	----	---	---	2
220 - 230			----	-4.1	6.4	----	69	---	6
230 - 240			2.1	-1.6	----	----	---	---	2
240 - 250			2.9	----	7.7	----	57	---	4
250 - 260			----	-3.2	----	-2.8	---	75	3
260 - 270			3.5	-5.8	8.8	-10.0	34	262	3
270 - 280			7.4	-5.8	----	-11.1	---	235	6
280 - 290			10,500	5.1	-4.5	----	----	---	3
290 - 300		11,000	7.1	-1.6	----	-7.3	---	46	7
300 - 310			8.0	-10.9	----	----	---	---	10
310 - 320			6.7	-7.4	----	-11.9	---	254	5
320 - 330	----		-4.8	----	-9.0	---	177	3	
<sup>b</sup> 330 - 340	4.4		-9.0	----	----	---	---	9	
340 - 350	10,500		8.3	-9.3	----	----	---	14	
<sup>a</sup> 350 - 360	11,000		11.2	-4.5	----	----	---	---	7
<sup>b</sup> 360 - 370		5.1	-7.4	----	----	---	---	6	
370 - 380		4.6	-2.6	8.1	----	71	---	6	
380 - 410		----	----	----	----	---	---	0	

<sup>a</sup>cloud entry.  
<sup>b</sup>cloud exit.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
May 13, 1947 - Flight 1					
Airplane 353 - Traverse 2 Length of traverse 138.8 sec, 38,771 ft					
<sup>a</sup> 0 - 10	11,000	12.1	-6.4	----	6
10 - 20		7.3	-4.1	----	8
20 - 30		9.6	-8.9	----	7
30 - 40	11,500	4.8	-6.1	11.1	78
40 - 50	11,000	5.1	-4.1	7.4	112
50 - 60		5.1	----	6.1	76
60 - 70		6.7	-3.5	15.5	242
70 - 80		4.1	-1.6	----	79
80 - 90		3.5	-4.1	----	36
<sup>b</sup> 90 - 100	11,500	4.7	-3.5	----	----
100 - 110		9.3	----	----	----
110 - 120	11,000	----	-5.4	----	-7.2
120 - 130		8.0	----	----	-5.2
130 - 140	10,500	4.0	-1.5	----	----
May 27, 1947 - Flight 2					
Airplane 351 - Traverse 1 Length of traverse 1360.8 sec, 475,733 ft					
0 - 210	21,000	----	----	----	----
210 - 220		7.0	-11.7	----	----
220 - 230		11.1	-11.1	26.9	83
230 - 240		----	----	----	----
240 - 250		----	-8.2	----	-10.9
250 - 260		7.6	-20.6	8.8	54
260 - 270		16.2	-19.7	26.3	-10.0
270 - 280		22.2	-15.5	19.9	-11.3
280 - 290		13.6	-7.0	----	----
290 - 300	21,500	10.5	-16.2	26.1	463
300 - 310	22,000	15.5	-15.9	----	----
310 - 320		15.9	-11.4	15.0	138
320 - 330	21,500	19.7	-23.1	39.6	-47.8
330 - 340	22,000	12.0	-11.4	----	----
340 - 350		9.5	-6.2	4.3	104
350 - 360	22,500	8.6	-4.8	10.7	-9.4

<sup>a</sup>Cloud entry.<sup>b</sup>Cloud exit.

NACA

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
May 27, 1947 - Flight 2								
Airplane 351 - Traverse 1 Length of traverse 1360.8 sec, 475,733 ft								
<sup>a</sup> 360 - 370	22,500	6.7	-18.4	----	-18.2	---	130	5
370 - 380		9.2	-6.3	12.4	-25.6	99	121	3
380 - 390		12.0	-6.7	9.5	-9.4	97	61	5
390 - 400		----	-10.5	----	----	---	---	3
400 - 410		8.6	-10.5	19.2	----	143	---	11
410 - 420		11.7	-8.6	16.8	----	26	---	4
420 - 430		5.4	-4.8	15.3	----	30	---	4
430 - 440		3.5	-7.6	18.9	-16.3	272	193	5
<sup>b</sup> 440 - 450		----	----	7.6	----	56	---	1
450 - 520		----	----	----	----	---	---	0
520 - 530		----	-5.1	----	-11.3	---	354	1
530 - 640		----	----	----	----	---	---	0
640 - 650	20,500	4.1	----	----	----	---	---	1
650 - 660		----	-3.8	----	-4.5	---	36	1
660 - 680	21,000	----	----	----	----	---	---	0
680 - 690		----	-5.4	----	----	---	---	1
690 - 770		----	----	----	----	---	---	0
770 - 780		----	-4.7	----	----	---	---	1
780 - 860		----	----	----	----	---	---	0
860 - 870		6.6	----	10.8	----	110	---	1
870 - 880		5.0	-6.0	8.6	----	59	---	3
880 - 890		5.0	-9.9	----	-18.7	---	279	2
890 - 900	20,500	5.0	-7.2	----	-9.9	---	362	3
900 - 910		6.9	-3.5	12.0	-6.4	102	39	5
910 - 920	21,000	3.5	-5.7	5.2	-10.8	206	75	5
920 - 930		2.8	-3.8	8.7	----	348	---	5
930 - 940		9.1	-11.3	6.7	----	121	---	4
940 - 950		5.0	-3.8	12.5	-11.8	129	211	3
950 - 960		7.2	-6.6	13.5	----	195	---	5
960 - 970		----	-7.2	----	-10.1	---	41	3
<sup>a</sup> 970 - 980		11.3	-7.6	25.7	----	285	---	7
980 - 990		8.8	-6.6	----	-16.2	---	31	5
990 - 1000		6.9	-6.9	----	----	---	---	5
1000 - 1010		14.8	-12.0	14.2	-9.3	133	153	9
1010 - 1020		12.3	-14.5	----	-22.3	---	35	11

<sup>a</sup>Cloud entry.  
<sup>b</sup>Cloud exit.



TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
May 27, 1947 - Flight 2					
Airplane 351 - Traverse 1 Length of traverse 1360.8 sec, 475,733 ft					
1020 - 1030	21,000	7.2	-----	-----	3
1030 - 1040		7.9	-11.6	14.8	7
1040 - 1050		-----	-5.7	-----	1
1050 - 1060		12.6	-7.2	-17.5	6
1060 - 1070		11.0	-6.6	16.6	2
1070 - 1080	20,500	5.7	-5.0	10.3	2
1080 - 1090		9.8	-2.8	17.4	3
1090 - 1100		14.5	-7.9	27.9	7
1100 - 1110		13.5	-----	19.4	2
1110 - 1120		13.5	-20.5	36.0	9
1120 - 1130		9.8	-15.7	-10.7	3
1130 - 1140		14.8	-5.4	6.4	4
1140 - 1150		9.8	-----	20.5	2
1150 - 1160		-----	-----	-----	0
1160 - 1170		-----	-3.8	-----	1
1170 - 1180		-----	-6.6	-5.9	1
1180 - 1290		-----	-----	-----	0
1290 - 1300		-----	-6.3	-21.5	1
<sup>b</sup> 1300 - 1310		-----	-----	-----	0
1310 - 1370	20,000	-----	-----	-----	0
Airplane 348 - Traverse 1 Length of traverse 250.4 sec, 79,227 ft					
<sup>a</sup> 0 - 20	16,000	-----	-----	-----	0
20 - 30		4.4	-8.5	-----	4
30 - 40		10.8	-6.3	-11.9	8
40 - 50		5.7	-15.5	-----	6
50 - 60	15,500	6.6	-----	-----	3
60 - 70		7.6	-----	4.9	2
70 - 80		4.4	-2.2	3.1	2
80 - 100		-----	-----	-----	0
100 - 110		13.3	-10.4	-19.7	7
110 - 120		8.5	-12.3	-----	8
120 - 130	15,000	14.6	-19.6	-----	9

<sup>a</sup>Cloud entry.<sup>b</sup>Cloud exit.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)		Maximum true gust velocity $U_{t\max}$ (fps)		Gust gradient distance (ft)		No. of gusts
May 27, 1947 - Flight 2								
Airplane 348 - Traverse 1 Length of traverse 250.4 sec, 79,227 ft								
130 - 140	14,500	12.3	-19.9	15.9	-----	123	---	16
140 - 150	15,000	10.1	-5.4	-----	-----	---	---	6
150 - 160	15,500	5.4	-8.9	-----	-----	---	---	11
160 - 170		7.9	-2.2	-----	-----	---	---	7
170 - 180		8.2	-----	-----	-----	---	---	2
180 - 190	16,000	-----	-----	-----	-----	---	---	0
190 - 200		3.5	-7.0	-----	-10.0	---	77	2
200 - 210		7.6	-6.6	-----	-10.3	---	67	8
210 - 220	15,500	8.2	-4.1	-----	-5.4	---	57	5
220 - 230		5.4	-5.1	-----	-----	---	---	8
230 - 240		3.2	-5.7	-----	-----	---	---	8
<sup>b</sup> 240 - 250		5.7	-6.0	-----	-----	---	---	11
250 - 260		-----	-----	-----	-----	---	---	0
Airplane 348 - Traverse 2 Length of traverse 606.9 sec, 196,153 ft								
0 - 50	15,500	-----	-----	-----	-----	---	---	0
50 - 60		4.1	-2.2	-----	-----	---	---	2
60 - 70		6.9	-----	7.7	-----	201	---	2
70 - 80		3.1	-----	-----	-----	---	---	1
80 - 90		2.8	-----	4.9	-----	197	---	1
90 - 100		4.1	-2.2	4.9	-----	57	---	3
100 - 110		-----	-----	-----	-----	---	---	0
110 - 120		4.4	-2.8	-----	-5.0	---	95	4
120 - 130		3.1	-----	-----	-----	---	---	1
130 - 140		-----	-----	-----	-----	---	---	0
140 - 150		3.1	-2.8	-----	-----	---	---	3
150 - 160		-----	-2.8	-----	-----	---	---	2
160 - 170		2.5	-5.0	-----	-12.8	---	46	2
170 - 180		-----	-----	-----	-----	---	---	0
180 - 190		7.8	-5.0	-----	-----	---	---	5
190 - 200		-----	-----	-----	-----	---	---	0
200 - 210		-----	-----	-----	-----	---	---	0
210 - 220		3.1	-4.7	-----	-----	---	---	4
220 - 230		-----	-5.0	-----	-----	---	---	5

<sup>b</sup>cloud exit.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
May 27, 1947 - Flight 2								
Airplane 348 - Traverse 2 Length of traverse 606.9 sec, 196,153 ft								
230 - 240	15,500	----	-2.8	1.6	-----	173	---	3
240 - 250		----	-4.4	----	-----	---	---	3
250 - 260	16,000	4.1	-6.6	----	-4.2	---	62	5
<sup>a</sup> 260 - 270		3.8	-11.3	6.1	-18.2	56	219	6
270 - 280	15,500	3.1	-4.1	----	-----	---	---	4
280 - 290		5.6	-----	----	-----	---	---	2
290 - 300		4.4	-3.1	6.6	-6.7	133	104	5
300 - 310		1.9	-3.8	----	-----	---	---	2
310 - 320		3.4	-5.0	----	-13.0	---	54	6
320 - 330		6.6	-5.0	----	-----	---	---	4
330 - 340		2.8	-----	----	-----	---	---	2
340 - 350	16,000	4.1	-4.4	----	-----	---	---	4
350 - 360		-----	-11.0	----	-19.3	---	129	4
360 - 370	15,500	5.6	-5.0	----	-13.5	---	272	2
370 - 380		-----	-4.4	----	-----	---	---	1
380 - 390		3.4	-1.6	----	-----	---	---	3
390 - 400		5.0	-5.0	----	-----	---	---	7
400 - 410		10.0	-7.8	5.4	-----	162	---	6
410 - 420	16,000	9.7	-9.1	9.4	-14.9	38	85	9
420 - 430		16.6	-19.4	14.2	-----	148	---	8
430 - 440		-----	-13.2	----	-29.3	---	265	4
440 - 450	16,500	-----	-8.5	----	-----	---	---	4
450 - 460	16,000	27.6	-12.2	----	-----	---	---	10
460 - 470		-----	-13.5	----	-----	---	---	9
470 - 480	16,500	10.7	-21.0	----	-27.8	---	447	8
480 - 490		16.0	-11.3	31.0	-----	103	---	7
490 - 500		11.3	-8.5	----	-----	---	---	4
500 - 510		-----	-2.5	----	-8.1	---	56	2
510 - 520		2.8	-2.8	----	-----	---	---	3
520 - 530		3.8	-----	4.9	-----	57	---	1
530 - 540		3.8	-3.8	----	-----	---	---	2
540 - 550		2.8	-1.9	----	-----	---	---	2
550 - 560		3.1	-4.4	----	-----	---	---	3
<sup>b</sup> 560 - 590	16,000	-----	-----	----	-----	---	---	0
590 - 600		-----	-----	----	-----	---	---	0
600 - 610		-----	-----	----	-----	---	---	0

<sup>a</sup>Cloud entry.<sup>b</sup>Cloud exit.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e \max}$ (fps)	Maximum true gust velocity $U_{t \max}$ (fps)	Gust gradient distance (ft)	No. of gusts
May 27, 1947 - Flight 2					
Airplane 360 - Traverse 1 Length of traverse 809.0 sec, 210,080 ft					
0 - 130	11,000	----	----	---	0
130 - 140		----	-5.4	---	1
140 - 150		----	-3.4	---	1
150 - 190		----	----	---	0
<sup>a</sup> 190 - 200		7.2	-9.1	---	2
200 - 210		17.4	-19.2	---	4
210 - 220		----	----	---	0
220 - 230		----	----	-7.7	1
230 - 240		6.6	-7.6	---	5
240 - 250		11.4	-7.6	-14.0	2
250 - 260	10,500	9.5	-8.8	---	10
260 - 270		5.7	-3.2	---	2
270 - 280		11.0	-12.3	---	7
280 - 290		4.7	-6.0	8.3	5
290 - 310		----	----	---	0
310 - 320		----	-6.3	---	3
320 - 330		10.7	-8.8	---	5
330 - 340		5.4	-10.1	---	4
340 - 350	10,000	5.0	-5.7	7.7	8
350 - 360		7.9	-2.5	-8.0	3
360 - 370		----	-4.4	-3.7	4
370 - 380		----	----	---	3
380 - 390		----	----	---	0
390 - 400		8.2	-6.0	16.9	5
<sup>b</sup> 400 - 410		4.1	-5.7	-18.5	7
<sup>a</sup> 410 - 420		8.5	-5.4	---	8
420 - 430		----	-6.6	3.6	5
430 - 440	10,500	18.9	-10.4	---	4
440 - 450		8.2	-9.1	---	9
450 - 460		10.1	-13.9	---	9
460 - 470	10,000	9.8	-18.0	4.9	10
470 - 480		19.9	-11.7	---	6
480 - 490	9,500	10.1	-4.4	---	5
490 - 500		6.3	----	6.6	1
500 - 540		----	----	---	0
540 - 550		11.0	-9.1	----	4

<sup>a</sup>Cloud entry.<sup>b</sup>Cloud exit.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
May 27, 1947 - Flight 2					
Airplane 360 - Traverse 1 Length of traverse 809.0 sec, 210,080 ft					
550 - 560	9,500	11.0	-13.2	14.8	5
560 - 570	10,000	8.2	-2.5	---	3
570 - 580	10,500	5.4	-9.1	---	4
580 - 590		14.5	-10.4	---	9
590 - 600		6.0	-15.8	-12.7	5
600 - 610		14.8	-12.6	-8.5	8
610 - 620	10,000	2.8	-11.7	---	7
620 - 630		4.4	-9.1	---	8
630 - 640		6.6	-4.4	-17.9	4
640 - 650		2.5	-6.6	---	6
650 - 660	10,500	4.7	-6.6	-20.6	2
660 - 670		6.3	-3.8	-14.2	2
670 - 680		---	---	-10.7	0
680 - 690		6.9	-5.7	---	8
690 - 700	10,000	4.1	-7.9	-8.3	5
700 - 710		4.1	-6.6	---	3
710 - 720		---	-4.4	-10.6	2
720 - 730		4.1	-8.2	8.8	3
730 - 740	10,500	13.6	-2.8	11.3	6
740 - 750		9.5	-16.1	-6.7	5
750 - 760		9.1	-6.3	---	7
760 - 770		6.9	-2.8	-8.6	3
770 - 780	10,500	14.8	-9.8	---	6
780 - 790		---	---	---	0
790 - 800		4.4	-3.5	---	4
<sup>b</sup> 800 - 810		4.4	-3.2	---	2
Airplane 360 - Traverse 2 Length of traverse 306.4 sec, 85,832 ft					
<sup>a</sup> 0 - 10	10,500	7.8	-14.1	---	9
10 - 20	11,000	8.5	-7.2	14.6	7
20 - 30		11.9	-11.0	---	7
30 - 40		14.8	-13.5	---	8
40 - 50		4.1	-3.4	9.5	3
50 - 60	11,000	6.6	-6.0	-12.8	3

<sup>a</sup>cloud entry.  
<sup>b</sup>cloud exit.



TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts		
May 27, 1947 - Flight 2							
Airplane 360 - Traverse 2 Length of traverse 306.4 sec, 85,832 ft							
60 - 70	11,000	8.2	-6.0	----	2		
70 - 80		7.5	-5.6	----	2		
80 - 90		4.4	-7.8	12.8 -8.8	4		
90 - 130		----	----	----	0		
130 - 140		2.5	-6.9	19.0	65	4	
140 - 150		5.6	-11.3	----	-22.6	5	
150 - 160		4.7	-3.8	----	----	3	
160 - 170		6.0	-6.0	----	-10.0	2	
170 - 180		5.3	-8.8	8.7	-17.7	6	
180 - 190		7.8	-6.9	11.4	-6.7	4	
190 - 200	10,000	7.5	-2.5	7.2	150	2	
200 - 210		10.0	-2.5	----	----	2	
210 - 220		19.5	-27.6	40.5	128	5	
220 - 230		7.8	-3.8	----	-12.8	4	
230 - 240		5.0	-9.1	6.8	-24.6	2	
240 - 250		9,500	15.7	-11.3	----	----	6
250 - 260			19.8	-8.5	28.2	67	11
260 - 270			----	-14.1	----	----	1
270 - 280			11.3	-21.0	----	----	8
280 - 290			----	-2.8	----	-5.7	2
290 - 300	5.0		-2.5	4.7	-7.4	4	
<sup>b</sup> 300 - 310	----		----	----	----	0	
Airplane 353 - Traverse 1 Length of traverse 805.3 sec, 203,024 ft							
0 - 50	5,500		----	----	----	0	
50 - 60			----	-5.7	----	2	
60 - 70		----	-9.5	----	1		
70 - 80		2.2	-6.3	5.3	34	2	
80 - 110		----	----	----	----	0	
110 - 120		4.4	-5.7	7.9	113	3	
120 - 140		----	----	----	----	0	
140 - 150		8.5	----	8.4	170	2	
150 - 160		----	----	----	----	0	
160 - 170		6,000	10.1	-4.7	----	69	3

<sup>b</sup>Cloud exit.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
May 27, 1947 - Flight 2					
Airplane 353 - Traverse 1 Length of traverse 805.3 sec, 203,024 ft					
170 - 180	6,000	----	-3.5	----	1
<sup>a</sup> 180 - 190	5,500	2.8	----	4.6	1
190 - 200		5.1	-6.0	8.0	3
200 - 210		4.1	-4.4	6.6	2
210 - 220		----	-8.9	----	2
220 - 230		7.0	-5.1	----	5
230 - 240		7.6	-4.7	----	4
240 - 250		8.2	-9.2	----	8
250 - 260	6,000	4.4	----	6.8	1
260 - 270		----	-9.5	----	3
270 - 280		9.2	-5.4	6.7	4
280 - 290	5,500	14.9	-8.5	14.5	7
290 - 300	6,000	4.1	-8.9	15.0	4
300 - 310		7.3	-11.1	----	7
310 - 320	5,500	21.2	-17.7	36.0	11
320 - 330		15.8	-12.7	14.9	8
330 - 340		11.4	-11.1	----	10
340 - 350		12.0	-15.2	----	5
350 - 360		5.4	-8.2	----	4
360 - 380		----	----	----	0
380 - 390	6,000	----	-13.0	----	2
390 - 400		5.1	-13.9	15.1	3
400 - 410		----	-12.3	----	4
410 - 430	5,500	----	----	----	0
430 - 440		4.1	----	8.0	2
440 - 450		----	----	----	0
450 - 460		----	-4.4	----	2
460 - 470		----	-3.5	----	1
470 - 480		4.7	-5.7	6.9	2
480 - 490		----	-3.5	----	1
490 - 500		----	-4.7	----	1
500 - 510		10.1	-8.9	----	6
510 - 520		7.3	-11.1	----	6
520 - 530		----	-7.6	----	2
530 - 540		6.3	-7.0	8.4	4
540 - 550		4.1	-6.3	----	4
550 - 560		7.3	-7.3	----	5

<sup>a</sup>Cloud entry.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e \max}$ (fps)	Maximum true gust velocity $U_{t \max}$ (fps)	Gust gradient distance (ft)	No. of gusts			
May 27, 1947 - Flight 2								
Airplane 353 - Traverse 1 Length of traverse 805.3 sec, 203,024 ft								
560 - 570	5,500	12.7	-5.4	9.4	----	22	---	7
570 - 580		----	-10.4	----	----	----	----	1
580 - 590		7.6	----	10.7	----	76	---	2
590 - 600		3.8	-16.5	5.3	----	69	---	4
600 - 610		4.7	----	----	----	----	----	1
610 - 660		----	----	----	----	----	----	0
660 - 670		----	-4.4	----	----	----	----	1
670 - 680		----	----	----	----	----	----	0
680 - 690		----	-3.8	----	----	----	----	1
690 - 730		----	----	----	----	----	----	0
730 - 740		2.5	-10.1	5.9	----	37	---	4
<sup>b</sup> 740 - 750		3.5	----	----	----	----	----	1
750 - 760		----	-3.2	----	----	----	----	1
760 - 770		3.2	-3.2	4.9	----	150	---	2
770 - 780		----	-3.8	----	----	----	----	1
780 - 810		----	----	----	----	----	----	0
Airplane 353 - Traverse 2 Length of traverse 517.3 sec, 137,229 ft								
0 - 40	5,500	----	----	----	----	----	----	0
40 - 50		----	-5.0	----	-5.2	----	64	1
50 - 60		4.4	----	8.5	----	57	---	1
<sup>a</sup> 60 - 70		2.8	-5.7	----	----	----	----	3
70 - 80		4.4	-5.0	----	----	----	----	5
80 - 90		4.1	----	6.6	----	248	---	1
90 - 100	6,000	4.4	-6.9	----	----	----	----	6
100 - 110	6,500	----	-15.4	----	----	----	----	1
110 - 120	6,000	3.1	----	----	----	----	----	1
120 - 130		10.7	----	----	----	----	----	3
130 - 140		9.1	-6.6	----	----	----	----	3
140 - 150	6,500	3.1	-15.7	----	----	----	----	5
150 - 160	6,000	12.2	-6.0	17.3	-7.8	106	134	6
160 - 170		10.4	-6.6	----	-15.7	----	239	7
170 - 180		----	-9.7	12.7	----	47	----	2
180 - 190		4.1	-6.3	----	----	----	----	9

<sup>a</sup>cloud entry.  
<sup>b</sup>cloud exit.



TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_e$ max (fps)	Maximum true gust velocity $U_t$ max (fps)	Gust gradient distance (ft)	No. of gusts			
May 27, 1947 - Flight 2								
Airplane 353 - Traverse 2 Length of traverse 517.3 sec, 137,229 ft								
190 - 200	6,000	6.6	-10.4	----	-22.7	---	237	7
200 - 210		10.7	-6.3	----	----	---	---	9
210 - 220		4.1	-5.7	----	----	---	---	5
220 - 230		13.8	-9.4	----	----	---	---	8
230 - 240		5.7	-10.1	16.1	----	125	---	6
240 - 250		11.9	-13.2	----	----	---	---	6
250 - 260		4.1	-10.4	----	----	---	---	4
260 - 270		11.9	-4.1	19.6	----	71	---	6
270 - 280		8.8	-10.4	----	----	---	---	7
280 - 290		5,500	4.1	-6.3	----	----	---	---
290 - 300	4.1		-3.8	7.8	----	65	---	7
<sup>b</sup> 300 - 310	----		-2.8	----	----	---	---	1
310 - 320	----		----	----	----	---	---	0
320 - 330	----		-2.8	----	----	---	---	1
330 - 340	----		----	----	----	---	---	0
340 - 350	----		-2.8	----	----	---	---	1
350 - 360	4.1		----	----	----	---	---	1
360 - 520	----		----	----	----	---	---	0
May 29, 1947 - Flight 3								
Airplane 327 - Traverse 1 Length of traverse 996.4 sec, (e) ft								
	e							
Airplane 348 - Traverse 1 Length of traverse 638.7 sec, 186,604 ft								
0 - 120	21,000	----	----	----	----	---	---	0
120 - 130		4.0	----	9.1	----	303	---	1
130 - 180		----	----	----	----	---	---	0
180 - 190		3.4	----	6.7	----	362	---	1
<sup>a</sup> 190 - 410		----	----	----	----	---	---	0
410 - 420		4.3	----	6.9	----	227	---	1

<sup>a</sup>Cloud entry.<sup>b</sup>Cloud exit.<sup>e</sup>Failure in operation of airspeed-altitude recorder prevented computations for gust velocities and length of traverse in feet.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
May 29, 1947 - Flight 3					
Airplane 348 - Traverse 1 Length of traverse 638.7 sec, 186,604 ft					
420 - 530	21,500	----	----	---	0
530 - 540	21,000	4.0	7.5	190	1
<sup>b</sup> 540 - 640		----	----	---	0
Airplane 356 - Traverse 1 Length of traverse 982.1 sec, 308,518 ft					
0 - 10	16,000	4.1	----	---	2
10 - 20		4.1	-6.0	---	4
20 - 30		----	-3.8	---	1
30 - 40		----	-2.8	---	1
40 - 50		----	----	---	0
50 - 60		2.5	-6.9	---	3
<sup>a</sup> 60 - 70		4.7	11.1	27	3
70 - 80		----	-8.9	366	1
80 - 90		2.5	5.0	53	3
90 - 100		3.5	-7.2	---	3
100 - 110		6.9	----	---	1
110 - 120		10.1	-3.8	---	5
120 - 130		7.2	-5.0	174	6
130 - 140		6.3	9.4	74	4
140 - 150		5.7	-3.8	237	3
150 - 160		6.9	-3.8	174	3
160 - 170		5.4	7.7	142	1
170 - 180		----	----	---	0
180 - 190	16,500	5.0	-3.8	---	3
190 - 200		----	----	---	0
200 - 210	16,000	3.5	-3.8	---	2
210 - 220		----	-2.8	---	1
220 - 230		----	----	---	0
230 - 240		3.8	-4.1	288	4
240 - 280		----	----	---	0
280 - 290		2.5	----	---	1
290 - 300		----	-5.4	230	1
300 - 380		----	----	---	0

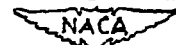
<sup>a</sup>Cloud entry.<sup>b</sup>Cloud exit.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
May 29, 1947 - Flight 3								
Airplane 356 - Traverse 1 Length of traverse 982.1 sec, 308,518 ft								
380 - 390	16,000	----	-4.1	----	-8.3	---	222	1
390 - 410		----	----	----	----	---	---	0
410 - 420		2.5	----	----	----	---	---	1
420 - 460		----	----	----	----	---	---	0
460 - 470		----	-5.3	----	-9.7	---	395	1
470 - 630		----	----	----	----	---	---	0
630 - 640		----	-2.8	----	-11.5	---	384	1
640 - 650		4.4	-3.4	9.3	----	183	---	3
650 - 660		3.8	----	----	----	---	---	1
660 - 810		----	----	----	----	---	---	0
810 - 820		----	-8.8	----	-15.4	---	165	1
820 - 830		4.4	-4.1	6.7	----	196	---	2
830 - 840		2.5	----	----	----	---	---	1
840 - 850		----	-2.5	----	-5.8	---	74	1
850 - 930		----	----	----	----	---	---	0
930 - 940		5.0	----	----	----	---	---	1
940 - 950		----	----	----	----	---	---	0
950 - 960		----	-3.4	----	----	---	---	1
960 - 970	15,500	3.4	-6.3	6.1	----	237	---	3
970 - 980		8.2	-4.4	----	----	---	---	2
980 - 990		----	----	----	----	---	---	0
Airplane 353 - Traverse 1 Length of traverse 903.2 sec, 263,734 ft								
0 - 70	11,000	----	----	----	----	---	---	0
70 - 80		2.2	-2.5	----	-4.6	---	56	2
80 - 120		----	----	----	----	---	---	0
120 - 130		----	-2.8	----	-3.6	---	188	1
130 - 180		----	----	----	----	---	---	0
180 - 190		6.6	-7.3	----	----	---	---	5
190 - 200		----	----	----	-13.8	---	239	1
200 - 210		2.8	-3.8	----	----	---	---	5
210 - 220		----	----	----	----	---	---	0
220 - 230		5.0	-5.0	----	----	---	---	2
230 - 240		5.4	-4.1	13.2	----	79	---	3

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{\text{max}}$ (fps)	Maximum true gust velocity $U_{\text{tmax}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
May 29, 1947 - Flight 3								
Airplane 353 - Traverse 1 Length of traverse 903.2 sec, 263,734 ft								
240 - 250	11,000	7.9	-2.2	----	-7.5	---	85	2
250 - 260		----	----	----	----	---	---	0
260 - 270		----	----	----	-13.0	---	344	1
270 - 280		4.1	-4.7	----	-13.4	---	252	3
280 - 290		----	-6.3	----	----	---	---	1
290 - 300		----	----	----	----	---	---	0
300 - 310		----	----	5.9	----	250	---	1
<sup>a</sup> 310 - 320		4.1	----	----	----	---	---	1
320 - 330		----	----	----	----	---	---	0
330 - 340		5.0	-3.8	----	-6.2	---	148	3
340 - 350	10,500	3.5	-8.5	----	-9.7	---	88	4
350 - 360		7.6	-11.0	14.1	----	289	---	4
360 - 370		7.9	-11.7	----	-15.7	---	207	7
370 - 380		9.5	-5.7	----	-20.6	---	82	9
380 - 390		3.8	-5.0	7.3	----	114	---	7
390 - 400		8.8	-11.7	6.4	----	91	---	6
400 - 410		----	----	5.2	----	126	---	1
410 - 420		2.8	-3.8	----	----	---	---	7
420 - 430		----	-6.7	----	----	---	---	2
430 - 440		----	----	----	----	---	---	0
440 - 450	11,000	2.8	-3.8	7.0	----	257	---	3
450 - 460		----	-3.8	----	----	---	---	1
460 - 470		----	-3.8	----	----	---	---	1
470 - 480		----	----	----	----	---	---	0
480 - 490		6.0	----	11.3	----	270	---	1
490 - 500		----	----	----	----	---	---	0
500 - 510		7.5	-6.0	13.8	-11.2	101	240	2
510 - 520		5.0	-10.1	----	-15.6	---	270	4
520 - 530		3.5	-8.2	----	-8.2	---	165	3
530 - 540		4.1	-3.8	6.2	----	69	---	2
<sup>b</sup> 540 - 550	11,000	4.1	----	----	----	---	---	2
550 - 560		4.7	-3.8	----	-11.7	---	70	5
560 - 570		----	----	----	----	---	---	0
570 - 580		5.0	----	8.7	----	76	---	2
580 - 590		3.5	-4.1	----	-11.2	---	92	2
590 - 600		----	-3.8	----	----	---	---	3
600 - 610		5.3	-4.7	----	-6.1	---	63	3
610 - 620		----	----	----	----	---	---	3

<sup>a</sup>Cloud entry.<sup>b</sup>Cloud exit.



TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{\text{emax}}$ (fps)	Maximum true gust velocity $U_{\text{tmax}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
May 29, 1947 - Flight 3								
Airplane 353 - Traverse 1 Length of traverse 903.2 sec, 263,734 ft								
620 - 630	11,000	12.0	-5.0	32.4	----	45	---	2
630 - 640		----	-4.7	7.5	-7.0	93	246	4
640 - 650		4.4	-3.8	5.7	----	226	---	5
650 - 660		----	-6.9	----	-10.4	---	180	1
660 - 670		4.7	-6.3	10.9	----	284	---	6
670 - 680		3.8	-5.7	----	----	---	---	2
680 - 690		3.8	-4.1	----	-8.4	---	241	5
690 - 700		3.1	-7.5	----	----	---	---	4
700 - 720		----	----	----	----	---	---	0
720 - 730		----	----	----	-6.3	---	107	1
730 - 750		----	----	----	----	---	---	0
750 - 760		----	-4.4	----	-4.3	---	38	1
760 - 770		5.3	----	13.6	----	114	---	1
770 - 780		3.8	-4.1	----	----	---	---	7
780 - 790		1.9	-2.2	----	----	---	---	2
790 - 800		4.4	----	----	----	---	---	1
800 - 810		2.5	----	----	----	---	---	1
810 - 820		----	-3.6	6.8	-6.0	348	118	2
820 - 830		2.5	-4.1	----	----	---	---	3
830 - 840		4.7	-4.1	----	----	---	---	6
840 - 850		3.1	-6.0	----	----	---	---	5
850 - 860		6.0	-4.1	----	----	---	---	5
860 - 870		3.1	-2.2	----	----	---	---	3
870 - 880		5.0	----	5.1	----	116	---	1
880 - 910		----	----	----	----	---	---	0
Airplane 351 - Traverse 1 Length of traverse 998.9 sec, 259,703 ft								
$d_0$ - 290	6,000	----	----	----	----	---	---	0
290 - 300		2.8	----	4.6	----	270	---	1
300 - 310		----	----	----	----	---	---	0
310 - 320		----	-3.1	----	-7.1	---	327	1
320 - 400		----	----	----	----	---	---	0
400 - 410		----	----	3.6	----	271	---	1
410 - 420		2.8	----	4.8	----	319	---	1
420 - 530		----	----	----	----	---	---	0
530 - 540		----	-4.7	----	----	---	---	1

<sup>d</sup>Cloud entry and exit not indicated on records.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Concluded

Time interval (sec)	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
May 29, 1947 - Flight 3					
Airplane 351 - Traverse 1					
Length of traverse 998.9 sec, 259,703 ft					
540 - 570	6,000	----	----	----	0
570 - 580		----	-4.1	----	1
580 - 590		2.8	----	----	2
590 - 600		2.8	-4.7	----	4
600 - 610		2.2	-5.6	-8.7	3
610 - 620		2.8	-3.8	7.0	3
620 - 630		2.8	----	----	1
630 - 640		2.8	----	3.4	1
640 - 650		2.8	-4.4	----	3
650 - 660		----	-5.3	----	1
660 - 670		3.5	-4.7	----	5
670 - 680		2.8	-4.7	-8.7	5
680 - 690		2.8	-3.1	----	2
690 - 700		3.8	-3.8	5.9	3
700 - 710		2.2	-3.8	5.0	3
710 - 720		2.8	-7.8	----	5
720 - 730		5.3	----	----	2
730 - 740		----	----	----	0
740 - 750		6.9	----	----	3
750 - 760		7.8	-1.9	-9.1	2
760 - 780		----	----	----	0
780 - 790		6.0	-3.8	----	3
790 - 800		3.1	----	----	1
800 - 810	5,500 6,000	2.2	-5.3	-9.7	3
810 - 820		----	----	----	0
820 - 830		2.8	----	6.5	1
830 - 840		2.2	-4.1	----	2
840 - 860		----	----	----	0
860 - 870		3.1	----	----	1
870 - 880		----	----	----	0
880 - 890		5.3	----	----	1
890 - 910		----	----	----	0
910 - 920		5.3	----	----	1
920 - 950		----	----	----	0
950 - 960		----	-4.7	-8.4	2
960 - 970		----	-4.1	----	1
970 - 980		5.3	----	6.9	1
980 - 1000		----	----	----	0

TABLE II.- SUMMARY OF DRAFT VELOCITY MEASUREMENTS FROM FLIGHTS  
OF P-61C AIRPLANES WITHIN THUNDERSTORMS

Date	Flight no.	Air- plane no.	Assigned altitude (ft)	Tra- verse no.	Draft location from start of traverse (sec)		Draft extent (ft)	Average draft velocity (fps)
					Start	End		
5-13-47	1	348	26,000	1	59.9	78.0	6,232	-31.8
				2	26.3 48.0	41.9 57.8	5,385 3,409	-20.5 28.6
				a <sub>3</sub>				
		354	21,000	1	92.4 113.3 863.4	110.0 123.0 885.6	5,969 3,319 6,291	11.4 -20.6 21.6
		360	16,000	1	251.0 288.0 335.0	263.2 294.0 346.0	3,402 1,749 3,267	-10.4 33.3 18.2
		353	11,000	2	36.0 118.0	53.0 139.0	4,956 6,407	30.3 17.4
				1	204.8 249.6 304.3 339.0 359.2	223.3 261.3 315.8 352.8 364.8	5,281 3,358 3,222 3,994 1,561	13.5 13.8 38.5 -27.2 35.7
				2	20.0	36.7	4,618	12.0
5-27-47	2	351	21,000	1	281.0 320.0 334.0 398.0	304.0 332.0 364.0 420.0	8,804 4,736 11,569 7,433	39.1 -37.5 35.3 -20.5
		348	16,000	1	48.8 91.2	69.0 101.2	6,699 3,094	-34.5 -17.6
				2	409.8 464.4	442.4 481.8	9,932 5,492	26.7 32.9

<sup>a</sup>No draft velocities indicated by records.

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TABLE II.- SUMMARY OF DRAFT VELOCITY MEASUREMENTS - Concluded

Date	Flight no.	Air-plane no.	Assigned altitude (ft)	Tra-verse no.	Draft location from start of traverse (sec)		Draft extent (ft)	Average draft velocity (fps)
					Start	End		
5-27-47	2	360	11,000	1	204.0	213.0	2,210	-48.9
					264.0	273.0	2,338	-31.1
					305.0	343.0	9,509	-10.5
					352.0	364.0	3,175	12.5
					417.0	436.4	3,547	31.7
					465.0	490.0	6,479	-27.2
					491.0	505.0	3,646	21.4
					557.0	596.4	10,088	31.2
					596.8	635.0	9,363	-22.6
					747.0	757.4	2,809	-28.8
				2	80.0	100.0	5,166	-10.8
					162.0	179.0	4,596	-14.7
					205.0	215.0	2,644	30.0
					219.7	247.7	7,260	-28.0
		353	6,000	b <sub>1</sub>				
5-29-47	3	327	26,000	b <sub>1</sub>				
		348	21,000	a <sub>1</sub>				
		356	16,000	1	105.0	125.3	6,029	9.2
		353	11,000	1	170.0	184.0	4,062	11.4
					222.5	245.4	6,617	-7.0
					347.0	378.0	9,364	-21.8
					378.0	395.0	5,324	17.6
					456.0	475.0	5,700	-11.9
					536.0	553.4	5,012	-9.2
		351	6,000	a <sub>1</sub>				

<sup>a</sup>No draft velocities indicated by records.<sup>b</sup>Failure in operation of airspeed-altitude recorder prevented computations for draft velocities.

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<u>Subject</u>	<u>Number</u>
Gusts - Structure	6.1.2.1
Gusts - Turbulence	6.1.2.3
Gusts - Frequency	6.1.2.2

ABSTRACT

The gust and draft velocities evaluated from records of NACA instruments installed in P-61C airplanes participating in thunderstorm flights at Clinton County Army Air Field, Ohio, from May 13 to May 29, 1947 are presented.